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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/595,914  | 05/19/2006  | Akira Otani          | P29987              | 8957             |
| 7055 7590 04/26/2010<br>GREENBLUM & BERNSTEIN, P.L.C.<br>1950 ROLAND CLARKE PLACE<br>RESTON, VA 20191 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| KRUPICKA, ADAM C  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 1784  |             |                      |                     |                  |
| NOTIFICATION DATE   |             | DELIVERY MODE        |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

**Application No.**

10/595,914

**Applicant(s)**

OTANI ET AL.

**Examiner**

Adam C. Krupicka

**Art Unit**

1784

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 March 2010.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.  
4a) Of the above claim(s) 3-6 and 8 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1, 2 and 7 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SI/22)  
4) ☐ Interview Summary (PTO-413)  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_  
Paper No(s)/Mail Date \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 29, 2010 has been entered. Claims 1-8 are pending, claims 3-6 and 8 remain withdrawn.

### ***Claim Objections***

**Claim 7** is objected to for use of repetitive language which may lead to confusion. Applicants' amendment to claim 7 filed March 29, 2010 adds a series of limitations which have already been set forth in the claim "wherein the average particle size of the conductive particles is 1 to 8 $\mu$ m, and the average particle distance between adjacent particles is at least once but five times or less the average particle size and not greater than 20 $\mu$ m, and wherein the thickness of the anisotropic conductive adhesive sheet is at least 1.5 times the average particle distance but not greater than 40 $\mu$ m."

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claims 1 and 2** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants' specification has been reviewed with respect to the phrase "the conductive particles are arranged to form vertices of approximately equilateral triangles" however support could not be found. Applicants point to paragraph 0024 of their published application for support as well as examples 1 and 2. The examiner acknowledges that applicants have demonstrated support for close packing of particles on a sheet which is stretched equally at 90 degrees in the lengthwise and crosswise directions. However in order for the stretching to result in vertices of approximately equilateral triangles the particles must be of the same size. When the particles are the same size the close packing results in a hexagonal arrangement that when stretched equally in perpendicular directions results in particles which are vertices of six equilateral triangles. However the particles are disclosed as having an average particle diameter, yet each individual particle may vary in size. The result of close packing of particles which have variations in size is not a hexagonally packed system, even small variations in size may result in large variations in geometry when multiplied across hundreds or thousands of particles.

Therefore the resulting pattern of particles in the stretched film is not necessarily a regular array and does not absolutely result in vertices of approximately equilateral triangles.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 2 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Connell *et al.* (PGPub US 2001/0008169 A1) in view of Kropp *et al.* (US Pat. 5,362,421), in view of Calhoun *et al.* (US Pat. 5,240,761).

**Regarding applicants' claims 1 and 2**, Connell *et al.* teach an anisotropic adhesive layer comprising an adhesive composition such as that taught by Kropp *et al.* (*paragraph 0038*). The adhesive composition of Kropp *et al.* comprises an initiator (*considered to be a curing agent*) and a curable thermoplastic resin (*abstract and col. 2 lines 20-46*). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the adhesive of Kropp *et al.* as the adhesive composition in forming the adhesive layer of Connell *et al.* because Connell *et al.* is directed to the use of the adhesive of Kropp *et al.* as a useful adhesive in preparing the anisotropic adhesive sheet of Connell *et al.* (*paragraph 0038*).

Connell *et al.* also teach conductive gold-coated polymeric spheres (*considered to be metal particles, paragraph 0064*) that are in the same region of thickness within the adhesive layer. This is because the particles are placed into dimples all of about the same depth which

corresponds to the average particle size (*paragraph 0046*). When the adhesive is coated thereon it does not penetrate deeper than the dimples thereby forming an adhesive layer on which the conductive particles exist within no more than the depth of an average particle (*paragraph 0050*). Therefore the maximum thickness range the particles can occupy is one particle or 1.0 times the average particle size within the thickness of the adhesive layer.

Further 99.2% of the particles of Connell *et al.* are considered not to contact other particles based on *figure 6(c)* which shows a micrograph of dimples in a single particle embodiment. The micrograph shows 475 dimples, 4 of which contain two particles, or 99.2% contain one particle. Further the example associated with *figure 6(c)* discloses an average particle size of 4.9 $\mu$ m, and a spacing of 15 $\mu$ m or approximately three times the particle thickness.

Connell *et al.* do not appear to teach a total adhesive layer thickness. However, one of ordinary skill in the art at the time of the invention would have found it obvious to optimize the thickness of the adhesive layer to achieve the ideal adhesive force for an intended use without using too much adhesive as to unnecessarily increase production costs or too much adhesive as to make the layer so thick as to prevent particles from properly contacting opposing electrodes when used in a manner as suggested in *figure 5(c)*, yet enough adhesive must be applied to hold the particles and to sufficiently adhere articles during an indented use.

Connell *et al.* do not appear to explicitly teach the arrangement of particles that form vertices of approximately equilateral triangles. Connell *et al.* do however disclose that anisotropic adhesive sheets are conventionally used for forming electrical connections between opposing electrode pads (*paragraphs 0002 and 0003*). Calhoun *et al.* teach an adhesive tape for

electrically interconnecting elements on two substrates, where the particles are substantially uniformly spaced from their six nearest neighbors (*abstract*). This arrangement allows for the conductive particles to be much closer together without touching laterally, allowing reliable electrical connections between facing arrays of tiny closely spaced electrical components which would otherwise be exceedingly difficult to interconnect (*col. 2 lines 41-48*). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to arrange the particles of Connell *et al.* such that the particles are substantially uniformly spaced from their six nearest neighbors, thereby allowing the adhesive sheet of Connell *et al.* to make reliable electrical connections between facing arrays of tiny closely spaced electrical components. The arrangement of particles such that each particle is equally spaced from the six nearest neighboring particles is considered to result in vertices of equilateral triangles.

**Regarding applicants' claim 7**, Connell *et al.* in view of Calhoun *et al.* teach an anisotropic adhesive sheet as shown above. Regarding the limitation that the film is formed by bi-axial stretching of a film having densely packed particles, it is noted that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process", *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Further, "the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product", *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 298, 292 (Fed Cir. 1983). See MPEP 2113.

It is the examiner's position that the manner in which the orientation of the particles is achieved does not result in a final adhesive sheets which are patentably distinct. Absent evidence of criticality regarding the presently claimed process and given that the anisotropic adhesive sheet meets the requirements of the claimed composition, the anisotropic adhesive sheet of Connell *et al.* clearly meets the requirements of the present claim.

### ***Response to Arguments***

The remarks filed March 29, 2010 have been carefully considered but have not been found to be persuasive.

Applicants argue the distinction between a rectangular array and vertices of equilateral triangles. While support has not been found for the newly claimed subject matter, Calhoun *et al.* has been introduced to demonstrate that the claimed arrangement of particles was known in order to increase the particle density as discussed in the rejection above.

Applicants set forth arguments with regard to the process language of claim 7 including reference to an illustration where the process of biaxially stretching a film having densely packed particles results in vertices of equilateral triangles. However Claim 7 does not require: the film to be equally stretched in perpendicular directions, the particles to have a close packing arrangement, or the particles to have a particular size distribution. Therefore applicants' arguments are not commensurate in scope with claim 7. It is noted that in response to applicants' amendment to claim 1, Calhoun *et al.* has been presented demonstrating that particle arrangements where each particle is substantially uniformly spaced from its six nearest neighbors



was known, therefore the present claims are not considered to establish a patentable distinction with the resulting sheet of Connell *et al.* in view of Calhoun *et al.*

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam C. Krupicka whose telephone number is (571)270-7086. The examiner can normally be reached on Monday - Thursday 7:30am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adam C Krupicka/  
Examiner, Art Unit 1784

/Jennifer C. McNeil/  
Supervisory Patent Examiner, Art Unit 1784